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SPECIAL REPORT

CASE FILE
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To

Technology Utilization Office
Code KT
National Aeronautics and Space Administration

Review of Federal Research and
Development in Command/Control Center Design

2 August 1971

Prepared by:

Technology Applications Group



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28 July 1971

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INTRODUCTION

The BSCP Technology Application Group (TAG) has actively participated in the design and early developmental phases of the ICMA-NASA Technology Application Program. After ranking the initial set of city-generated problems, NASA's Office of Technology Utilization assigned to TAG the task of determining the extent of relevant federal research and development support for selected problems. This included the problem of Command/Control Center Design which was ranked seventh by the cities.

Appendix A contains the ICMA Problem Statement for this problem. The need is described as follows: A radio transceiver is required for command and control communications during a civil disturbance. Also a means of communicating audio and visual signals from disturbance to command center is needed.

The TAG methodology for this investigation consisted of: 1) reviewing information currently available and conducting information searches to identify relevant funders and performers of relevant R&D; 2) contacting identified federal agency representatives to fully identify pertinent R&D effort; 3) contacting federal agency and law enforcement organization personnel to determine characteristics of current and planned advances in technology state-of-the-art; and 4) reviewing pertinent publications.

This report summarizes the information gathered to date of federal R&D efforts directly relevant to command/control center design. Recommendations for further NASA and ICMA actions are also presented.

Command/Control Center Design

"Command and control" is military terminology for the planning, direction, and control of operations. According to The President's Commission on Law Enforcement and Administration of Justice Task Force Report: Science and Technology it involves the organization of personnel and facilities to perform the functions of planning, situation intelligence, force status on monitoring, decision making, and execution. These concepts can also be applied to analogous police operations, leading to the possibility that command and control technology might also be applied. Usually command and control is performed in the communications center, the focal point of almost all the public's calls to the police.

The ICMA problem statement describes the city need as for a radio control communications during a civil disturbance. There is also need for a means of communicating audio and visual data signals from the disturbance to the command center. The problem statement says that police officials are currently saddled with communication devices which do not function effectively in a civil disturbance environment and are costly. It also expresses the mayor's need to see for himself from the command and control center what is happening, as a basis for forming judgements about what action should be taken.

The Task Force Report suggests a number of critical command and control problems that seriously limit police department's operational effectiveness:

1. Although a great deal of information about patrol car status and details of a call flows through the communications center, little of it can be readily recalled by whomever may need it. The communications center gets very little feedback on the results of its actions.
2. The location of patrol cars is only crudely given by their beat assignment.
3. The communications center delay is a significant part of the total response time. Studies in Los Angeles indicate that the communications center accounts for 30 to 50 percent of the total delay.
4. Most large-city police departments are faced with a severe radio spectrum congestion problem resulting in radio communication queues of patrol officers trying to reach their dispatchers. This situation will grow worse in the future as more cars and radios are added.
5. A city seeking to improve its operations has no guidelines on how best to design and organize a communications center. The great variability in approach from city to city, coupled with the lack of experimental evaluation of different meth-

ods, prevent any consensus on technical or operational approaches.

6. Contingency planning for command and control during emergency situations such as riots or disasters has been neglected by many police departments.

According to the Task Force Report design of effective radio networks is aggravated by the severe spectrum congestion in the police radio bands allocated to land mobile operations. Tests and studies all indicate serious congestion and a growing demand for more frequencies on the part of radio communications users. This is confirmed by the FCC in a number of their recent reports. In 1964 the report said: "One of the most pressing problems faced by the Commission is to find frequency relief for the public-safety, industrial and land-transportation radio services. These land mobile radio operations have grown rapidly in the past few years and frequency shortage has become acute in many geographic areas."

Police communicators often do not use frequency resources available to their municipalities primarily because these frequencies are not licensed for police use. The FCC has recognized the need for multiple use of radio frequencies by establishing within the Public Safety Radio Service a band of local government frequencies which can be used for any legitimate local activity. The majority of the frequencies in the public safety bands are, however, specified for type of user and forbidden to users not in the specified category. As a result, although a city may have sufficient total radio spectrum resources to create a highly efficient network including all departments, the police may be desperately short of frequencies.

According to the Task Force Report the primary responsibility for allocating frequency resources among police and fire protection and other municipal functions properly rests with the local government rather than with the FCC. This policy would make the municipal government responsible for the efficient use of its total radio spectrum resources. Then, with designs based on larger networks, greater efficiency becomes possible.

Under contract to the National Institute of Law Enforcement and Criminal Justice the Associated Public Safety Communications Officers (APCO) subcontracted to IIT Research Laboratory for a report titled Police Telecommunication Systems. It is intended to provide a comprehensive guide to police telecommunication systems.

The APCO report describes the following as vital services provided by a police telecommunication system.

- . Communication between citizens and the police department
- . Communication among members of the department in order to coordinate their activities and exchange information
- . Communication among police departments
- . Communication with other agencies

It describes the basic components of a police telecommunication system as:

1. A telephone system by which the citizen (and police officers) can reach the department for assistance or exchange of information. Alarm systems or call boxes may also perform this function.
2. A radio system by which police officers in vehicles and on foot can be in constant contact with headquarters and each other, and by which communication with other police departments can be carried out.
3. Data transmission systems, including means such as teletypewriter facilities, permitting the exchange by wire or radio of data and other information within the department or with other agencies, including centralized data banks.

The criteria used to judge the performance of a police communications network was that the average delay in getting a message on the air during a normal busy period should not exceed five seconds. With a ten second message length, this is compatible with a one to two minute response time, assuming the remainder of the period to be travel time once the dispatch is completed. This is compatible with recommendations of the President's Commission on Law Enforcement and Administration of Justice which indicated that reducing delays on emergency cases tends to increase apprehensions of criminals. A two minute delay was correlated with a 57% arrest rate; and a one minute delay with 63% arrest rate. A one to two minute response is thus a significant improvement in apprehensions in emergency cases.

Response time consists of two major components: Communication center response time (the time required in the communication center from receipt of the message by the patrol unit and arrival at the scene) and field response time (the time between receipt of the message by the patrol unit and arrival at the scene). An analysis of response time resulted in the conclusion that the best dollar investment to decrease overall response time is in the police communication center.

The APCO report says that there are many areas of advancing technology which have and will continue to find direct application to police telecommunication systems. It says that, among other things, adoption of improved and new equipment in the near future will help police departments to:

- . Keep in constant personal contact with all officers on patrol
- . Automatically keep a record of the status and location of police vehicles at all times
- . Retrieve information concerning auto registration, criminal histories, fingerprints, etc. quickly and accurately
- . Send coded or scrambled messages when necessary to maintain privacy
- . Exchange written messages between vehicles and base station to provide accurate rapid transmission of certain types of information
- . Use television for surveillance of buildings and high crime rate areas, traffic monitoring, lineup displays, and educational purposes.

Both land line and radio communication in police service are subject to the rules and regulations of the Federal Communications Commission. The most heavily used portions of the frequency spectrum which are available to the police extend from about 37 MHz to 46 MHz, called the low band; from about 154 MHz to 159 MHz, called the 150 MHz- or very high frequency (VHF)--or high-band; and from about 453 MHz to 465 MHz, called the 450 MHz--or ultra-high frequency (UHF) - band. In addition, the FCC has ruled that certain frequencies between 470 MHz and 512 MHz and between 806 MHz and 960 MHz may be used by land-mobile radio in the ten largest metropolitan areas in the U.S. For police radios in the low-band, the spacing between users' frequencies is 20 KHz, in the VHF high-band it is 15 KHz, and for the 450 MHz UHF-band it is 25 KHz. Because of their desirability and the relatively small area of the spectrum available in each band, the 150 MHz (VHF) and 450 MHz (UHF) bands have become extremely crowded with radio users. Much interference between users exists in these bands in some areas.

APCO concludes in their study that "Most of the problems which beset system planners are attributable to the lack of usable frequencies."

The National Academy of Engineering report to the Department of Housing and Urban Development Communications Technology for Urban Improvement lists several recommendations for crime prevention and emergency services. They are:

- . Implement a 24-hour television surveillance system to help protect citizens from crime on city streets. Integrate several communications techniques into a security system for housing projects and public institutions.
- . Develop and test in one or more cities a system to automatically locate the origin of incoming emergency calls to a city's emergency operation center in order to reduce response time and make it practical to implement a single emergency number such as 911.
- . Develop a model Municipal Command Center supplied with currently available electronic communications equipment to enable responsible city officials to plan effectively for, and respond to, city emergencies.

The NAE report does not refer to frequency allocation as a major problem. The report does say that perhaps the major change over the past few years has been the increasing use of solid state components and integrated circuits in both the base station and the mobile equipments and the investigation of the potential of the newly assigned 900 MHz region. It further states that the increased use of integrated and hybrid circuits will further reduce the size and cost of mobile equipment, while increasing the reliability and the degrees of freedom available for unique design characteristics. It concludes that present day mobile communications equipment represents sophisticated, mature design for the present state-of-the-art, and a continuing evaluation of advanced systems design may be anticipated as the available channel space is increased.

Current Research & Development

The National Institute of Law Enforcement and Criminal Justice (NILE) is the research arm of the Law Enforcement Assistance Administration and funds most of the government supported work in command and control systems.

NILE sent a four page questionnaire on requirements for a personal police transceiver to 800 police departments in cities with populations of greater than 35,000 people. Based on the replies from 500 cities they had the Air Force prepare a specification. The Air Force is doing the procurement for models for their own use. A two phase program is planned. Phase one, covering twelve months, is the design, development, fabrication and testing of six prototype transceiver radios to serve specific police needs. Phase two, covering six months, involves production design, testing, and initial production of final versions of the transceiver. In April of 1971 Sylvania, Martin-Marietta, and Teledyne were awarded phase one contracts.

The Departments of Housing and Urban Development, Commerce, Justice and Transportation, as well as the Federal Communications Commission have funded through HUD a National Academy of Engineering study on telecommunication needs of urban law enforcement agencies. This report, which has been published, focuses on the 911 system, automatic location systems, and closed circuit television for surveillance.

NILE has funded the Associated Public Safety Communications Officers (APCO) to perform several studies. Much of this work was then subcontracted to IITRI, Chicago. One contract was to study and evaluate police communications in the lower Lake Michigan area. This includes spectrum needs, criteria for evaluation of systems effectiveness, and new systems recommendations. Under contract to NILE, APCO has just completed a Reference Text for Police Radio Communications. The project was designed to compile available information about the operational technical and legal requirements of municipal and regional mobile - portable police radio systems and to assess near future requirements. This text is to be published by GPO.

NILE funded the Phoenix Police Department in 1968 to perform a study of applications of teleprinters. San Francisco also has a contract to work with Sylvania on two-way digital communications.

According to Walter Key (NILE/LEAA) the following cities are in the forefront of development in certain areas of command/control systems: St. Louis, computers; Kansas City, computers and transmittal of information to and from cars; New York City, SPRINT project (still not in final form); Chicago, one of the best overall capabilities; and Dade County which has interesting projects.

The New York City SPRINT (Special Police Radio Inquiry Network) system is a computer assisted dispatching system. It is intended to improve police response time to the public's calls for emergency services. Kansas City's ALERT (Automated Law Enforcement Response Team) is a computer based information system that provides real-time answers to queries of officers of the K.C. Police Department and all other law enforcement agencies representing Eastern Kansas and Western Missouri. Terminals are located within police cars.

ISPERN stands for the Illinois State Police Emergency Radio Network and is a program of the Illinois Department of Law Enforcement. It is a special high-band emergency radio frequency which establishes a common communications bond between all policemen in Illinois. It provides a common radio frequency which is monitored constantly and is uncluttered with normal radio traffic. It is intended to allow policemen at all levels--city, county, and state--to call on one another for assistance in times of emergencies such as riots, disasters, and apprehensions.

Conclusions and Recommendations

After a review of studies of command/control system we conclude there are two major problems facing the cities. They are:

1. Severe spectrum congestion in the police radio bands.
2. Severe limitation of funds to be spent on equipment and systems.

However, the survey of seventeen ICMA member cities does not reflect this. Of the eleven cities describing command/control system design as a problem, only three described cost and two frequency allocation as problems.

The NILE/Air Force development program should lead to transceivers which will meet the cities needs. It appears that the NASA/ICMA Technology Application Program cannot make a significant technical contribution to the spectrum congestion, funding, or transceiver development problems. A useful role for the ICMA would be to act as an interface between NILE and APCO and the ICMA member cities. We recommend that as a first step BSCP-TAG rewrite the problem statement for another ICMA survey of their member cities. Results would be submitted to NILE and APCO.

NILE was not willing to supply the transceiver specification to the ICMA or BSCP-TAG. If NASA could obtain the specification it could be reviewed by the ICMA member cities. This could be a first step in the cities' participation in the development program which could be of benefit to both NILE and the participating cities.

A NASA developed piece of hardware which is applicable to the cities need in the command/control area is the Microeye TV Camera. The camera's light weight, small size, and remote transmitting capability make it ideal for police surveillance applications. Results from a recent Chicago Police Department test are included in Appendix E. Further development of this camera should be evaluated. An ICMA advisory panel is currently planned for this area.

It would also be desirable to have a meeting with NILE and ICMA-TAP, NASA-OUT, and BSCP-TAG personnel to bring ICMA-TAP up to date on NILE plans and to outline a cooperative NILE/ICMA program.

APPENDIX A

Problem Statement

COMMAND/CONTROL CENTER DESIGN

A. Need

A radio transceiver for command and control communications during a civil disturbance. Also means of communicating audio and visual signals from disturbance to command center.

B. Background

The environment of a civil disturbance is characterized by high ambient noise level, violent confrontation, and may occur over a fairly significant land area. The disturbance itself may occur inside building structures, outside in the open streets, or both. Since these disturbances generally occur within an urban area, radio communication systems are subject to a variety of conditions which often cause severe interference in transmission. The effective containment of civil disturbances, in order to save lives and property, requires that police officials have the capability to direct their forces at the scene of the disturbance under these adverse conditions. Police officials are currently saddled with communication devices which do not function effectively under this environment and are costly.

Civil disturbances are now covered by people on the scene who report, by voice or radio communication, to the central headquarters what is happening. However, the mayor has no way of seeing for himself what is happening as a basis for forming judgements about what action should be taken.

C. Constraints and Specifications

1. Transceiver must be capable of operation either inside or outside a building structure.
2. Transceiver must be housed to withstand rugged treatment.
3. Transceiver must be situated such that it does not require use of hands to operate the device, e.g., in the helmet or vest pocket.
4. Transceiver must have sufficient power (volume) for the message to be heard over ambient noise (ear plug may be used but

cannot extend out as an extremity which would be grabbed and broken off during confrontation).

5. If desirable, on-off switches and volume controls could be eliminated.
6. The transceiver must function effectively in an urban environment containing considerable sources of interference.
7. Preferable that the receiver operate in the UHF region but it can be tolerated in the VHF region.
8. Device should be sufficiently inexpensive and have a sufficiently long life without maintenance that it can be thrown away.
9. Should be capable of 16 hours of continuous operation without replacing the power source.
10. Would prefer that power source be pen-light or transistor battery readily purchasable in a drug store.
11. Any antenna should be incorporated in the case or ear plug to avoid being broken off.

For an audio/visual unit to communicate back to command center:

1. Device must be mobile and not require wire leads to a power source.
2. Must be capable of transmitting audio and visual signals from any site of a civil disturbance back to the headquarters.
3. Some alternative methods might include receivers placed on high structures, long wave length devices which would transmit signal through structures, transceiver on helicopter, or satellite based communications.

D. Representative Available Equipment

E. Relevant Technology

APPENDIX B

Contact Reports

CONTACT REPORT

CONTACT BY:	<u>PHONE CALL</u>	<u>VISITS</u>	<u>OTHER</u>
	() TO BSCP	() VISIT TO BSCP	() _____
	(X) FROM BSCP	() VISIT TO _____	_____

DATE OF CONTACT: 7/14/71 GROUP: BSCP-TAG DATE OF REPORT: 7/27/61

CONTACT

PLACES AND POSITIONS: Walter Key.

COMPANY OR AGENCY: LEAA-NILE

ADDRESS:

PHONE: 386-5265

OP PERSONNEL: H. Cantor

CONTACT ORIGINATED (please be specific)

Call to obtain information on NILE supported effort in police command & control systems

SUBJECT: ICMA Problem: Command/Control Center Design

REPORT: Three contracts were let in April 71 to develop a new personal transceiver for police use. Companies are Sylvania, Martin-Marietta, and Teledyne. The Air Force is doing the procurement and partially funding. NILE developed the specifications based on a questionnaire to 800 police departments of cities of 35,000 or over. There were 500 replies. Specifications are available.

FILE and other Federal Agencies cofunded with HUD and NAE report on Urban Telecommunications.
It has been published.

Some older contracts include applications of teleprinter 68-Phoenix Police Dept. on Teleprinter grants, 2 contracts-1 complete. San Francisco PD to work with Sylvania on 2-way digital communication (Oakland also involved).

There have been a series of awards to APCO (subcontracted most of work to IITRI, Chicago) Phase 1, 2 to study/evaluate police communications in Lower Lake Michigan area including spectrum studies, criteria for evaluation of systems effectiveness, and new systems recommendations. Phase 3 is a reference text on the state-of-the-art of police communications. It has just been completed and will be published.

Entities that are doing work in this area include:

St. Louis - computers

.Kansas City-Computer and information to/from cars

N.Y. -SPRINT project (still not in final form) (if required, use additional paper)

ACTION TO BE TAKEN:

Write letter to key requesting questionnaire results (done)

Order NAE report (Received)

Obtain APCO report (Received) BY: BSCP DATE:

5 DISTRIBUTION: (please mark each copy)

X Contact File / () Shilling () Cantor () Johnston

File: ICMA:C&C ✓ () Weeks (X) Bivins (X) Loren

(X) Richards

CONTACT REPORT

CONTACT BY: PHONE CALL VISITS OTHER
() TO BSCP () VISIT TO BSCP () _____
() FROM BSCP () VISIT TO _____

TYPE OF CONTACT: _____ GROUP: _____ DATE OF REPORT: _____

CONTACT

NAMES AND POSITIONS: _____

COMPANY OR AGENCY: _____

ADDRESS: _____

PHONE: _____

TOP PERSONNEL: _____

HOW CONTACT ORIGINATED (please be specific) _____

SUBJECT: _____

REPORT: _____

- .Chicago-one of best overall capabilities
- .Orange County, Calif.-18 agencies, coordinated C&C communications System
- .Dade County has interesting projects
- .N.Y.C. Housing Authority (1800 high rise blds. to police)

Problems include the fact that there are so many autonomous groups-consensus is difficult.
There is very little data on actual situations on which to base systems design.

TV studies include

- .Mt. Vernon, N.Y.
- .New Jersey (?) small study
- .NAE (CBS Labs/Dr. Goldmark) NYPD tests in precincts to set parameters

(if required, use additional paper)

ACTION TO BE TAKEN: _____

BY: _____ DATE: _____

DISTRIBUTION: (please mark each copy)

- | | | | |
|------------------|--------------|------------|--------------|
| () Contact File | () Shilling | () Cantor | () Johnston |
| () File: _____ | () Weeks | () Bivins | () _____ |
| | () Richards | | () _____ |

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CONTACT REPORT

CONTACT BY: PHONE CALL VISITS OTHER
 () TO BSCP () VISIT TO BSCP ()
 (X) FROM BSCP () VISIT TO

DATE OF CONTACT: 7/22/71 GROUP: BSCP/TAG DATE OF REPORT: 7/23/71

CONTACT

NAMES AND POSITIONS: Captain Frank Campbell, Project Director, Phase 3, APCO Project 3

COMPANY OR AGENCY: Police Department

ADDRESS: Indianapolis, Indiana

PHONE: 317/633-7738

BSCP PERSONNEL: Todd Anuskiewicz

HOW CONTACT ORIGINATED (please be specific)

Called to obtain information on Associated Public Safety Communications Officers (APCO) report on police telecommunications systems.

SUBJECT: ICMA Problem: Command Control Center

REPORT: The Project funded by LEAA was conducted in three phases. First questionnaires were sent to 300 police departments in the Illinois area to determine their communication needs. Phase 2 established frequency allocations required by these departments. Phase 3 was to establish a network to utilize these frequencies adequately. This 3rd phase was not agreed to by LEAA. In place of this a manual was written which compiles available information about the operational, technical, and legal requirements of municipal and regional mobile-portable radio systems and to assess near future requirements. This manual was subcontracted to IITRI. It is complete and will be printed by GPO. Captain Campbell said that I could borrow a copy from their attorney in Washington, Joe Kittner of McKenna & Wilkinson (296-1600)

He said that Indianapolis had planned to supply each police officer with a 6-channel Motorola unit. This would be combined with a "911 system" and expanded information retrieval system. Funds were then stopped. Campbell said he thought some of this might be implemented after the next election. He indicated the politics of funding as his biggest problem.

He likes the idea of teleprinters in each car. He said that before he can afford them, computer terminals would probably be more effective. He said that Sylvania and Custom Chanute, Kansas are developing such devices. Sale price about \$3000.

(if required, use additional paper)

ACTION TO BE TAKEN:

to call Kittner to obtain report (Done 7/22)

BY: _____ DATE: _____

DISTRIBUTION: (please mark each copy)

(X) Contact File	() Shilling	() Cantor	() Johnston
(X) File: ICMA Problem	() Weeks	(X) Bivins	(X) Loren
Command & Control Center	(X) Richards	()	()

T O O M L O O M

CONTACT REPORT

CONTACT BY: PHONE CALL VISITS OTHER
 () TO BSCP () VISIT TO BSCP () _____
 (X) FROM BSCP () VISIT TO _____

DATE OF CONTACT: 7/22/71 GROUP: BSCP-TAG DATE OF REPORT: 7/23/71

CONTACT
NAMES AND POSITIONS: Jim Simpson

COMPANY OR AGENCY: Housing Consultant
ADDRESS: Arlington, Virginia

BSCP PERSONNEL: Todd Anuskiewicz PHONE: 534-6097

HOW CONTACT ORIGINATED (please be specific)
to request information on communications during the civil disturbances in Washington, D.C.

SUBJECT: ICMA Problem: Command & Control Centers
REPORT: Mr. Simpson is a member of the Military Affiliate Radio System (MARS) which is a group of paid and volunteer men who staff such a system. Each member has a radio in his car. There is a VHF repeater system at Silver Hill and a mobile backup repeater in a van. During the D.C. civil disturbance this system was used extensively to notify relatives of the National Guard because the telephone system became overloaded. Simpson confirmed that radio frequency bands are inefficiently utilized. A number of the bands in the D.C. area are only periodically active.

(if required, use additional paper)

ACTION TO BE TAKEN:

None required.

BY: _____ DATE: _____

DISTRIBUTION: (please mark each copy)

<input checked="" type="checkbox"/> Contact File	<input type="checkbox"/> Shilling	<input type="checkbox"/> Cantor	<input type="checkbox"/> Johnston
<input checked="" type="checkbox"/> File: ICMA Problem	<input type="checkbox"/> Weeks	<input checked="" type="checkbox"/> Bivins	<input checked="" type="checkbox"/> Loren
<input checked="" type="checkbox"/> Command & Control	<input checked="" type="checkbox"/> Richards	<input type="checkbox"/> _____	<input type="checkbox"/> _____

CONTACT REPORT

CONTACT BY: PHONE CALL VISITS OTHER
() TO BSCP () VISIT TO BSCP ()
(X) FROM BSCP () VISIT TO

TIME OF CONTACT: 7/22/71 GROUP: BSCP/TAG DATE OF REPORT: 7/23/71

CONTACT

NAMES AND POSITIONS: Jim Nicholson

COMPANY OR AGENCY: Office of Emergency Preparedness
ADDRESS: Washington, D.C.

PHONE: 395-5894

CP PERSONNEL: Todd Anuskiewicz

HOW CONTACT ORIGINATED (please be specific)
To request information about their command & control centers during emergency & how they
coordinate with police & other organizations.

SUBJECT: ICMA Problem: Command & Control Centers

REPORT: The OEP does not have an independent command and control or communications network.
They work with State Offices of Emergency Planning and Community coordinators to arrange
use police and army communications for disasters.
Their charter forbids action during civil disturbances.

(if required, use additional paper)

ACTION TO BE TAKEN:

None required.

BY: _____ DATE: _____

DISTRIBUTION: (please mark each copy)

(X) Contact File	() Shilling	() Cantor	() Johnston
(X) File: <u>ICMA Problem</u>	() Weeks	(X) Bivins	(X) <u>Loren</u>
<u>Command & Control</u>	(X) Richards	() _____	() _____

CONTACT REPORT

CONTACT BY:	<u>PHONE CALL</u>	<u>VISITS</u>	<u>OTHER</u>
	() TO BSCP	() VISIT TO BSCP	() _____
	(X) FROM BSCP	() VISIT TO _____	_____

OF CONTACT: 7/9/71 GROUP: BSCP/TAG DATE OF REPORT: 7/9/71

CONTACT

NAMES AND POSITIONS: Mr. Murfree

COMPANY OR AGENCY: Defense Documentation Center

ADDRESS: Alexandria, Virginia

PHONE: 274-6867

3. P PERSONNEL: Todd Anuskiewicz

DW CONTACT ORIGINATED (please be specific)

To obtain information related to Command/Control Center Design

JECT: ICMA Problem - Command/Control Center

SPORT:

Requested unclassified DDC search for a communications command/control center. This might be used by police during an urban civil disturbance.

(if required, use additional paper)

ION TO BE TAKEN:

7. DDC to send results to GWU

2. GWU will review and order pertinent documents

BY: _____ DATE: _____

5 DISTRIBUTION: (please mark each copy)

☒ Contact File ☐ Shilling ☐ Cantor ☐ Johnston

File: Command/Control () Weeks (X) Bivins (X) Loren

(X) Richards

CONTACT REPORT

CONTACT BY: PHONE CALL VISITS OTHER
() TO BSCP () VISIT TO BSCP ()
() FROM BSCP (X) VISIT TO

TIME OF CONTACT: 7/23/71 GROUP: BSCP DATE OF REPORT: 7/23/71

CONTACT

NAMES AND POSITIONS: Joe Kittner, Attorney

COMPANY OR AGENCY: McKenna & Wilkinson

ADDRESS: Washington, D.C.

PHONE: 296-1600

PERSONNEL: Todd Anuskiewicz

CONTACT ORIGINATED (please be specific)

As a result of my request for a copy of the APCO phase 3 Police Telecommunication systems report, Mr. Kittner invited me to discuss command and control problems.

SUBJECT: ICMA Problem: Command & Control

REPORT:

McKenna & Wilkinson specialize in FCC matters. Mr. Kittner's reason for inviting me to see him was to stress that the principal C&C problem is one of lack of available frequencies and frequency allocation rather than equipment design. He said that the reason phase 3 of the APCO project had been switched from a network design project to a telecommunication manual was that the frequency requirements indicated by phases 1 and 2 were much greater than those which could be made available. The cost of improved systems is also a limiting factor.

He gave me a copy of the summary report of phase 2 of the APCO project. He also said that the APCO annual meeting, which will be held early in August, will have a number of meetings addressing this subject. About 60 commercial organizations will exhibit equipment.

(if required, use additional paper)

ACTION TO BE TAKEN:

Suggest ICMA-TAP personnel consider attending APCO convention

BY: TAP DATE: August '71

DISTRIBUTION: (please mark each copy)

(X) Contact File () Shilling () Cantor () Johnston
(X) File: Command and Control ICMA () Weeks (X) Bivins (X) Loren
(X) Richards ()

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APPENDIX C

LEAA R&D

Police transceiver

Study seeks a
small and light
police transceiver.

One of the most important current projects of the National Institute of Law Enforcement and Criminal Justice is the development of a new personalized portable radio for police use.

The need for individual two-way communications with police officers while they are away from their vehicles has become particularly urgent. In the case of large civil disturbances, for example, police officers should be in constant communications with their commanding officers regardless of location.

Many patrolmen do not carry personal radios because units available today are not well designed to meet the unique requirements of policemen. Often, radios are heavy, bulky, expensive and breakable.

In general, individual policemen should be able to receive instructions and request assistance immediately without having to return to their vehicles to use connectional mobile radios. Employing individual personal radios will improve coordination of large-scale police actions. In addition, the safety of officers under attack will be greater due to their ability to summon aid quickly.

A two-way radio to meet these needs has been requested by police officials throughout the country. Such a radio must be designed to perform reliably under many environmental extremes.

appropriate methodological tool for obtaining estimates of the fraudulent use of credit cards and of the value loss due to bad checks.

The answer to these and many other questions of method and technique must be satisfactorily resolved before an efficient and valid full-scale, data-producing survey can be launched.

The culmination of these pilot tests is expected to result in one or more national surveys to develop base-line data on victimization rates and associated variables. These surveys will be repeated periodically to measure change in victimization experience over time. Ultimate plans call for a national series that will be expanded to obtain more detailed information and to provide statistics for states and large cities.

Airborne television

Camera will send
picture to ground
from helicopter.

An airborne closed-circuit live television capability could provide police commanders with an invaluable tool during civil disorders or major eruptions of violence at institutions.

The commander could use the television picture to help him decide how to deploy his men and equipment. He could use it for instant recall of incidents moments or hours after they occur. Videotapes of such pictures could be used, as well, for training purposes.

Helicopters have been used in civil disorder situations, but they have been limited to visual observations which are reported to the ground by radio.

An LEAA-sponsored program being undertaken in Los Angeles is aimed at demonstrating the feasibility of using airborne television to provide police commanders with a live picture of the event.

Hand-held camera. The program was first designed on the assumption that the helicopter provided a stable platform from which a permanently-mounted camera could broadcast a signal back to the ground. In later designs, however, the concept of the stable platform was abandoned in favor of one viewing the camera as a piece of movable equipment which could be used on any helicopter. This design resulted in use of a hand-held camera which can broadcast its signal to the ground. This equipment can be used on any available helicopter and is considerably cheaper than permanently-mounted cameras.

Los Angeles test. The Los Angeles Police Department has contracted with a private firm to install and evaluate a closed circuit television (CCTV) system in a helicopter. LEAA has awarded \$165,000 to Los Angeles for the project. The project should be completed by January 1971.

Assignments. The Tactical Operations and Planning Section of the Los Angeles Police Department will evaluate the operational capabilities of the airborne television system by performing the following tasks:

- (1) The filming of, and live transmission from, the scene of unusual occurrences;

- (2) The evaluation of this capability as it relates to intelligence gathering and the formulation of strategy and tactics;

- (3) The evaluation of this capability (in the area of unusual occurrences) as a training aid for field commanders;

- (4) The filming of selected situations, during the course of routine patrol and surveillance activities;

- (5) The evaluation of this capability (in the area of routine patrol and surveillance) as it relates to the training process and other benefits provided, such as documented visual evidence; and

- (6) The evaluation of the effectiveness of these capabilities as an aid to learning.

DF Grant No.—70-DF-305

Grantee—Tennessee Law Enforcement Planning Agency

Project Title—Metropolitan Nashville Criminal Justice Information System—Nashville, Tennessee

Monitoring Responsibility—Region 3

Award Date—6/30/70

Award Amount—\$150,000

Project Summary—A criminal justice information system that will have an immediate impact on the incidence of street crime, by improving command and control capabilities within the metropolitan police department and reducing response time and improving tactical employment.

DF Grant No.—70-DF-310

Grantee—New Jersey State Law Enforcement Planning Agency

Project Title—TAV (Total Area Coverage) Communications System

Monitoring Responsibility—Region 1

Award Date—6/30/70

Award Amount—\$149,974

Project Summary—To improve capabilities of Newark Tactical Patrol Force and the Investigative Division by providing increased communications ability, thereby reducing response time and increasing flexibility.

DF Grant No.—70-DF-416

Grantee—Michigan Office of Criminal Justice Programs

Project Title—Feasibility of Closed Circuit Television, Saginaw, Michigan

Monitoring Responsibility—Region 4

Award Date—6/30/70

Award Amount—\$3,352

Project Summary—To study the feasibility of a closed-circuit television system for use as a crime deterrent.

DF Grant No.—70-DF-171

Grantee—New Jersey State Law Enforcement Planning Agency

Project Title—Prevention, Detection and Riot Control

Monitoring Responsibility—Central OLEP

Award Date—6/16/70

Award Amount—\$100,000

Project Summary—To expand "Project Alert" to eight additional sites and to develop an Alert radio system coordinating control center to be installed in the New Jersey State Police Division Headquarters.

NI 70-005—\$3,143.12 From 8/15/69—3/20/70
Grantee—U. S. Army Materiel Command, Washington, D. C.

Title—Police Personal Transceiver Development Project

Abstract—This project for the development of personal transceiver radios for the police was transferred to the U. S. Air Force under NI 70-034.

NI 70-034—Amount to be determined by bids

Grantee—U. S. Air Force (For Procurement Services; Contractor(s) to be selected)

Title—Police Transceiver Development

Director—To be determined by contractor(s) which receive awards

Abstract—The project consists of two phases. Phase one, covering twelve months, will be the design, development, fabrication and testing of six prototype transceiver radios to serve specific police needs. Phase two, covering six months, involves production design, testing and initial production of final versions of the transceiver. A multiple contract award, through the U. S. Air Force, is anticipated.

NI 70-091—\$122,366 From 6/30/70—5/30/71

Grantee—Associated Public Safety Communications Officers, Inc., Pittsburgh, Pennsylvania

Title—Reference Text for Police Radio Communications

Director—Captain Frank D. Campbell

Abstract—This project is designed to compile available information about the operational, technical and legal requirements of municipal and regional mobile-portable police radio systems and to assess near future requirements. The compilation will be in the form of a text that will be written so as to be directly usable by persons whose background is either technical or operational. This text should be widely circulated to police chiefs, police department planners, State Planning Agencies, frequency coordinators, equipment suppliers and independent researchers.

NI 70-035—\$10,000 From 3/9/70—1/31/71

Grantee—Department of Housing and Urban Development, Washington, D.C.

Title—Program Definition Stages of a Broad Program to Determine the Benefits of Telecommunications Technology for Urban Functioning and Form

Director—Alan R. Siegel

Abstract—This effort will begin a unified examination of the total urban need for telecommunications systems and to suggest solutions. It will be jointly funded by the Departments of Commerce, Justice and Transportation, as well as the Federal Communications Commission. HUD will initially fund the project for \$200,000. The Institute-funded portion of the project will focus on telecommunication needs of law enforcement agencies.

APPENDIX D

STIF & DDC Search Summary

A NASA STIF search was conducted for "Command and Control System Technology." Most of the pertinent reports were controlled or secret but the search did indicate where and what type of work is being conducted. A summary follows:

1. Philco - Ford Corporation, Philadelphia, Pennsylvania
Digital systems
NASA Mission Control
2. Motorola, Inc., Scottsdale, Arizona
Digital systems
3. Naval Electronics Lab. Center for Command Control and Communications,
San Diego, California
4. Defense Communications Agency, Washington, D.C.
Application of TV to command/control
5. Stanford Research Inst., Menlo Park, California
Army field command control
6. Marine Corporation, Washington, D.C.
Digital switching terminals
7. Institute for Telecommunication Sciences, Boulder, Colorado
Analysis
8. Naval Weapons Center, China Lake
Digital data link
9. Mite Corporation, Bedford Massachusetts
Switching system design principles
10. Pittsburgh University Army Material Research Staff, Washington, D.C.
Random - access discrete address communication system
11. Hazeltine Corporation, Little Neck, New York
Digital television displays
12. AA System Development Corporation, Santa Monica, California
Command and control system analysis - functional time
diagram method
13. Naval Civil Engineering Lab., Port Hueneme, California
Experimental FM multiplexing transponder system for remote
radio control and telemetering
14. Institute for Defense Analysis, Washington, D.C.
A test of the effectiveness of command language
15. Jet Propulsion Laboratory, California
Institute of Technology, Pasadena
Space programs summary

4
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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 065810

AD-871 511L 15/3 15/7
ARMY LAND WARFARE LAB ABERDEEN PROVING GROUND MD
COMPREHENSIVE LAW AND ORDER ASSISTANCE
RESEARCH AND DEVELOPMENT (CLOARAD) PROGRAM. (U)
DESCRIPTIVE NOTE: FINAL REPT.;
MAY 70 94P WILSNACK, RICHARD W. ;
MCNIELL, JOSEPH W. ; SAMUELS, DAVID W. ; EGNER,
DONALD O. ; CAMPBELL, DONALD ;
REPT. NO. LWL-TR-70-08
PROJ: DA-2-X-663701-D-718, LWL-02-Y-69

UNCLASSIFIED REPORT
DISTRIBUTION: DOD ONLY: OTHERS TO COMMANDING
OFFICER, ARMY LAND WARFARE LAB., ABERDEEN
PROVING GROUND, MD. 21005.

DESCRIPTORS: (*INSURGENCY, CIVILIAN PERSONNEL),
(*ARMY OPERATIONS, CIVILIAN PERSONNEL), DEFENSE
SYSTEMS, WARNING SYSTEMS, DETECTORS, PROTECTION,
MILITARY PERSONNEL, PROTECTIVE CLOTHING, BODY
ARMOR, VEHICLES, POLICE, LIGHTING EQUIPMENT,
SEARCHLIGHTS, IDENTIFICATION SYSTEMS, NON-LETHAL
AGENTS, LAW, CONTROL, FIRES, SABOTAGE, URBAN
AREAS, MISSION PROFILES, COMMUNICATION SYSTEMS,
MANAGEMENT PLANNING, MILITARY REQUIREMENTS,
WIRE (U)

IDENTIFIERS: LAW AND ORDER, CIVIL DISTURBANCES,
*RIOT CONTROL, NATIONAL GUARD, *CROWD CONTROL,
SNIPERS, CURFEWS, CLOARAD (COMPREHENSIVE LAW
AND ORDER ASSISTANCE RESEARCH AND
DEVELOPMENT), COMPREHENSIVE LAW AND ORDER
ASSISTANCE RESEARCH AND DEVELOPMENT (U)

THE CLOARAD PROGRAM IS CONCERNED WITH HARDWARE
AND TACTICS OF POTENTIAL VALUE TO MILITARY FORCES
ASSIGNED TO HELP CONTROL CIVIL DISTURBANCES. THE
PROGRAM HAS BEEN A SMALL-SCALE ATTEMPT TO EVALUATE
SPECIFIC TACTICAL PROBLEMS AND REQUIREMENTS IMPOSED
ON MILITARY FORCES IN DISTURBANCES. THIS REPORT
DELINEATES THE MOST IMPORTANT PROBLEMS IDENTIFIED
DURING THE PROGRAM AND PRESENTS GUIDELINES FOR THE
SOLUTION OF THESE PROBLEMS. TWO FIRM
RECOMMENDATIONS ARE MADE IN THE REPORT: (1)
THERE SHOULD BE COMPREHENSIVE SYSTEMS ANALYSES TO
DETERMINE THE BEST FEASIBLE SOLUTIONS FOR THE
PROBLEMS STATED IN THE REPORT; AND (2) THERE
SHOULD BE A LARGER-SCALE, INTENSIVE EFFORT TO
ASSEMBLE AND ANALYZE PRE-DEFINED DATA ON CIVIL
DISTURBANCES. (U)

UNCLASSIFIED

5
065810

AD-867 601

15/3

17/2

DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA

CIVIL DEFENSE SYSTEMS; COMMUNICATIONS.

DESCRIPTIVE NOTE: REPORT BIBLIOGRAPHY JUL 60-OCT 69, (U)

MAR 70 136P

REPT. NO. DDC-TAS-70-37

UNCLASSIFIED REPORT

DISTRIBUTION: NO FOREIGN WITHOUT APPROVAL OF
OFFICE OF THE DIRECTOR OF DEFENSE RESEARCH AND
ENGINEERING, ATTN: DIRECTOR OF TECHNICAL
INFORMATION. WASHINGTON, D. C. 20301.

DESCRIPTORS: (*CIVIL DEFENSE SYSTEMS, COMMUNICATION
SYSTEMS), (*COMMUNICATION SYSTEMS,
*BIBLIOGRAPHIES), RADIO COMMUNICATION SYSTEMS,
RADIO BROADCASTING, RADIO RECEIVERS, RADIO
STATIONS, RADIO TRANSMITTERS, WARNING SYSTEMS,
REMOTE CONTROL SYSTEMS, VOICE COMMUNICATION SYSTEMS,
RADIO TELETYPE SYSTEMS, TELEPHONE COMMUNICATION
SYSTEMS, TELEVISION STATIONS, PUBLIC ADDRESS
SYSTEMS, NETWORKS, PROGRAMMING (COMPUTERS),
INDEXES, POLICE, COMMAND + CONTROL SYSTEMS,
COMMUNICATIONS CENTRAL (U)

THE BIBLIOGRAPHY IS A COLLECTION OF UNCLASSIFIED
REFERENCES ON CIVIL DEFENSE SYSTEMS:
COMMUNICATIONS. CORPORATE AUTHOR-MONITORING
AGENCY, SUBJECT, AND CONTRACT INDEXES ARE
INCLUDED. (AUTHOR) (U)

order

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 065818

AD-861 296 15/7 15/5
ARMY LIMITED WAR LAB ABERDEEN PROVING GROUND MD
RIOT CONTROL: ANALYSIS AND CATALOG. (U)
DESCRIPTIVE NOTE: FINAL REPT.,
OCT 69 163P SAMUELS, DAVID W. ; EGNER,
DONALD O. ; CAMPBELL, DONALD ;
REPT. NO. LWL-TR-69-14

UNCLASSIFIED REPORT

DESCRIPTORS: (*COUNTERINSURGENCY, *URBAN AREAS),
(*ARMY EQUIPMENT, MILITARY REQUIREMENTS),
INSURGENCY, INTENSITY, GROUP DYNAMICS,
LEADERSHIP, MOTIVATION, THREAT EVALUATION,
IDENTIFICATION, BUILDINGS, DAMAGE, SENSORS,
TRAFFIC, POPULATION, PROTECTION, COMBAT
INFORMATION CENTERS, COMMUNICATION EQUIPMENT,
ADVANCED WEAPONS, SMALL ARMS, LIGHT, NON-LETHAL
AGENTS, HEAT, SMOKE MUNITIONS, ARTILLERY,
ULTRASONIC RADIATION, CHEMICAL WARFARE AGENTS,
ANTIPERSONNEL WEAPONS, PSYCHOLOGICAL WARFARE, FIRE
EXTINGUISHERS, MEDICAL EQUIPMENT, ARMOR, COSTS,
ADVANCED PLANNING (U)
IDENTIFIERS: *RIOT CONTROL, *CIVIL DISTURBANCES,
PRIVATE PROPERTY, PATROLS, PACIFICATION, (U)
*GHETTOES

THIS REPORT ATTEMPTS TO PROVIDE A SYSTEMATIC
ANALYSIS OF SOME TYPES OF CIVIL DISTURBANCES AND A
SURVEY OF RELATED DEVELOPMENTAL MATERIEL. THE
MAJOR LIMITATION OF THE ANALYSIS IS ITS RESTRICTION
TO GHETTO - TYPE RIOTS, NECESSITATED BY LIMITATIONS
IN TIME AND AVAILABLE INFORMATION. HOWEVER, THE
MATERIEL ITEMS DESCRIBED ARE UNIVERSAL IN APPLICATION
TO VARIOUS FORMS OF CIVIL DISTURBANCES. THE FIRST
PART OF THE REPORT ANALYZES SUCH RIOTS BY IDENTIFYING
COMMON CHARACTERISTICS OF A NUMBER OF DISTURBANCES
WHICH HAVE OCCURRED IN THE UNITED STATES AND
DESCRIBING THE EXPERIENCES OF VARIOUS SECURITY FORCES
IN THEIR CONTROL. THE LATTER PART OF THE REPORT
SERVES AS A CATALOG OF MATERIEL ITEMS, NOT ALREADY IN
THE ARMY INVENTORY, WHICH MAY BE USEFUL IN
PROVIDING A MORE FLEXIBLE RESPONSE TO THE SPECIAL
REQUIREMENTS OF RIOT CONTROL. (AUTHOR) (U)

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 065818

AD-702 769 5/1 13/12
OHIO STATE UNIV COLUMBUS DISASTER RESEARCH CENTER
AN ANALYSIS OF LOS ANGELES FIRE DEPARTMENT
OPERATIONS DURING WATTS, (U)
DEC 69 89P WARHEIT, GEORGE ; QUARANTELLI,
E. L. ;
REPT. NO. DRC-MONOGRAPH SER-7
CONTRACT: OCD-PS-64-46
PROJ: OCD-2651-A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH FLORIDA
UNIV., GAINESVILLE.

DESCRIPTORS: (*DISASTERS, ORGANIZATIONS),
(*ORGANIZATIONS, OPERATIONAL READINESS),
(*DECISION MAKING, ORGANIZATIONS), COMMUNICATION (U)
SYSTEMS, CIVIL DEFENSE SYSTEMS, CALIFORNIA
IDENTIFIERS: LOS ANGELES(CALIFORNIA), FIRE
DEPARTMENTS, *WATTS RIOT 1965, RIOTS, CRISIS
SITUATIONS, COMMUNITY CRISIS SITUATIONS (U)

THE MONOGRAPH EXAMINES THE OPERATIONS OF THE LOS
ANGELES FIRE DEPARTMENT DURING THE CIVIL
DISTURBANCE -- THE SO-CALLED WATTS RIOT -- IN
AUGUST 1965. THE FOCUS OF THE MONOGRAPH IS ON
ONE MAJOR TYPE OF COLLECTIVE RESPONSE, THAT
MANIFESTED BY COMPLEX OR FORMAL ORGANIZATIONS WITH
BUREAUCRATIC STRUCTURES. THREE MAJOR COMPONENTS OF
THE LOS ANGELES FIRE DEPARTMENT ARE EXAMINED
AND IT IS SHOWN HOW THE STRUCTURE AND FUNCTIONING OF
THE ORGANIZATION WAS ALTERED DURING THE DISTURBANCE.
ATTENTION IS GIVEN TO MODIFICATIONS IN
ADMINISTRATIVE DECISION-MAKING PROCEDURES, THE
HANDLING OF TASKS, AND THE PATTERNS OF COMMUNICATION
WITHIN THE ORGANIZATION. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 065818

AD-672 786 5/11

SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
A SYSTEMS APPROACH TO COMMAND AND CONTROL IN CRIME
PREVENTION AND CONTROL;

(U)

MAY 68 23P HERRMANN, WILLIAM W. ;
REPT. NO. SDC-SP-2751/000/01

UNCLASSIFIED REPORT

DESCRIPTORS: (*CRIMINOLOGY, COMMAND + CONTROL
SYSTEMS), CIVILIAN PERSONNEL, POLICE, DECISION
MAKING, REACTION (PSYCHOLOGY), BEHAVIOR, LAW,
INTERFACES, MOTIVATION, STATISTICAL ANALYSIS,
PUBLIC OPINION, PERFORMANCE (HUMAN)

(U)

MEANINGFUL APPLICATIONS OF CONTEMPORARY SCIENCE AND
TECHNOLOGY TO CRIME PREVENTION AND CONTROL REQUIRE
BOTH A DEFINITION AND AN UNDERSTANDING OF THE
OBJECTIVES OF ADMINISTRATION OF JUSTICE SYSTEMS AND
SUBSYSTEMS. IT IS ESSENTIAL THAT BOTH THE
TECHNOLOGICAL AND NON-TECHNOLOGICAL CONSTRAINTS THAT
IMPINGE UPON THE OPERATION OF THESE SYSTEMS BE
IDENTIFIED AND ASSESSED IN CONTEXT WITH SPECIAL
ENVIRONMENTS. THE PROVISION OF SCIENTIFIC AND
TECHNOLOGICAL CAPABILITIES MUST BE PRECEDED BY AN
ASSESSMENT AND, WHERE NECESSARY, AN UPGRADING OF THE
CAPABILITIES AND LIMITATIONS OF EXISTING
ADMINISTRATION OF JUSTICE SYSTEMS. THIS PAPER
DISCUSSES SOME OF THE MORE APPARENT RAMIFICATIONS
INHERENT IN WHAT MIGHT BE REFERRED TO AS A SYSTEMS
APPROACH TO SOME OF THE MORE IMMEDIATE PROBLEMS
INVOLVED IN ATTEMPTING TO APPLY SCIENCE AND
TECHNOLOGY TO THE ADMINISTRATION OF JUSTICE. THE
COMMENTS ARE DIRECTED TO A MORE SPECIFIC SET OF
FUNCTIONS IN ONE AGENCY, THE LAW ENFORCEMENT OR
POLICE AGENCY. THE FUNDAMENTAL FUNCTIONS OF A
COMMAND-AND-CONTROL SYSTEM IN THE CONTEXT OF A
GENERALIZED VIEW OF PORTIONS OF THE POLICE PROCESS
ARE DISCUSSED IN GENERAL TERMS. (AUTHOR)

(U)

UNCLASSIFIED

065818

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 065818

AD-665 893 5/11
RAND CORP SANTA MONICA CALIF
COMMUNICATIONS GOALS FOR LOS ANGELES: A WORKING
PAPER FOR THE LOS ANGELES GOALS PROGRAM,
FEB 68 36P CHESLER, L. G. ; DORDICK, H.
S. ;
REPT. NO. P-3769

(U)

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOCIAL COMMUNICATION, *URBAN
PLANNING), PUBLIC HEALTH, EDUCATION, HOUSING,
TRANSPORTATION, ENVIRONMENT, URBAN AREAS, SOCIAL
SCIENCES, EMPLOYMENT, COSTS, POPULATION,
TELEVISION COMMUNICATION SYSTEMS, ADVANCED
PLANNING
IDENTIFIERS: LOS ANGELES(CALIFORNIA)

MF

(U)
(U)

THIS PAPER WAS PREPARED AT THE REQUEST OF THE
CITY PLANNING DEPARTMENT OF LOS ANGELES TO
ASSIST THE CITY IN ESTABLISHING GOALS FOR FUTURE
PHYSICAL PLANNING. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 065818

AD-651 109 13/2 9/2 5/8 5/11
RAND CORP SANTA MONICA CALIF
URBAN NODE IN THE INFORMATION NETWORK;
APR 67 26P BARAN, PAUL ; GREENBERGER,
MARTIN ;
REPT. NO. P-3562

(U)

UNCLASSIFIED REPORT

AVAILABILITY: AVAILABLE FROM RAND CORP., SANTA
MONICA, CALIF. \$2.00.

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH SLOAN
SCHOOL OF MANAGEMENT AND MASSACHUSETTS INSTITUTE OF
TECHNOLOGY. PRESENTED AT THE SESSION ON THE CITY OF
TOMORROW, IEEE INTERNATIONAL CONVENTION, MARCH 20-
23, 1967, NEW YORK CITY. AN EARLIER VERSION WAS
PRESENTED AT THE ENGINEERING FOUNDATION RESEARCH
CONFERENCE ON TECHNOLOGY AND THE CITY MATRIX,
AUGUST 25, 1966, SANTA BARBARA, CALIFORNIA.

DESCRIPTORS: (*URBAN PLANNING, COMMUNICATION
SYSTEMS), (*COMMUNICATION SYSTEMS, DIGITAL
COMPUTERS), MAN-MACHINE SYSTEMS, COLOR TELEVISION,
TRANSPORTATION, SOCIOLOGY, POPULATION, URBAN
AREAS, COMMERCE, EMPLOYMENT, PREDICTIONS

(U)

THE AUTHOR CONSIDERS SOME OF THE MAJOR CONTEMPORARY
PROBLEMS OF CITIES AND ASKS HOW THE FAST DEVELOPING
TECHNOLOGIES OF COMPUTERS AND COMMUNICATIONS CAN
HELP. THE EVOLVING ROLE THAT FUTURE CITIES MAY
PLAY AS NODES IN NATIONAL AND TRANS-NATIONAL
INFORMATION NETWORKS IS DISCUSSED.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 065818

AD-648 758

5/11

SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
THE SYSTEMS APPROACH IN CRIME PREVENTION AND
CONTROL.

(U)

DESCRIPTIVE NOTE: PROFESSIONAL PAPER,
FEB 67 22P HERRMANN, WILLIAM W. ;
REPT. NO. SP-2751

UNCLASSIFIED REPORT

DESCRIPTORS: (*CRIMINOLOGY, CONTROL SYSTEMS),
SOCIAL SCIENCES, COMMAND + CONTROL SYSTEMS, LAW,
SYSTEMS ENGINEERING, POLICE, DECISION MAKING

(U)

MEANINGFUL APPLICATIONS OF CONTEMPORARY SCIENCE AND TECHNOLOGY TO CRIME PREVENTION AND CONTROL REQUIRE BOTH A DEFINITION AND AN UNDERSTANDING OF THE OBJECTIVES OF ADMINISTRATION OF JUSTICE SYSTEMS AND SUBSYSTEMS. IT IS ESSENTIAL THAT BOTH THE TECHNOLOGICAL AND NON-TECHNOLOGICAL CONSTRAINTS THAT IMPINGE UPON THE OPERATION OF THESE SYSTEMS BE IDENTIFIED AND ASSESSED IN CONTEXT WITH SPECIAL ENVIRONMENTS. THE PROVISION OF SCIENTIFIC AND TECHNOLOGICAL CAPABILITIES MUST BE PRECEDED BY AN ASSESSMENT AND, WHERE NECESSARY, AN UPGRADING OF THE CAPABILITIES AND LIMITATIONS OF EXISTING ADMINISTRATION OF JUSTICE SYSTEMS. THIS PAPER DISCUSSES SOME OF THE MORE APPARENT RAMIFICATIONS INHERENT IN WHAT MIGHT BE REFERRED TO AS A SYSTEMS APPROACH TO SOME OF THE MORE IMMEDIATE PROBLEMS INVOLVED IN ATTEMPTING TO APPLY SCIENCE AND TECHNOLOGY TO THE ADMINISTRATION OF JUSTICE. THE COMMENTS ARE DIRECTED TO A MORE SPECIFIC SET OF FUNCTIONS IN ONE AGENCY, THE LAW ENFORCEMENT OR POLICE AGENCY. THE FUNDAMENTAL FUNCTIONS OF A COMMAND-AND-CONTROL SYSTEM IN THE CONTEXT OF A GENERALIZED VIEW OF PORTIONS OF THE POLICE PROCESS ARE DISCUSSED IN GENERAL TERMS. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 065818

AD-391 896 5/4 15/3 15/7
ADJUTANT GENERAL'S OFFICE (ARMY) WASHINGTON D C
TASK FORCE, WASHINGTON, 4-16 APRIL 1968.
DESCRIPTIVE NOTE: AFTER ACTION REPT.
APR 68 107P
MONITOR: OACSFOR OT-RD-68DD13

(U)

UNCLASSIFIED REPORT
DISTRIBUTION: NOFORN.

DESCRIPTORS: (*ARMY OPERATIONS, DISTRICT OF COLUMBIA), CIVIL DEFENSE SYSTEMS, CIVILIAN PERSONNEL, MILITARY ORGANIZATIONS (U) NON-LETHAL AGENTS, LIMITED WAR, POLICE, DEPLOYMENT, LAW, LOGISTICS, SMALL ARMS AMMUNITION, OFFICER PERSONNEL, PUBLIC OPINION, COMMUNICATION SYSTEMS, PERFORMANCE (HUMAN), MILITARY REQUIREMENTS, ARMY TRAINING, DECISION MAKING, BUILDINGS, MILITARY LAW, GROUP DYNAMICS, LEADERSHIP, FIRES

(U)

IDENTIFIERS: RIOTS, PERFORMANCE (GROUP), RIOT CONTROL, LESSONS LEARNED, CIVIL DISTURBANCES, ARSON, RIOT CONTROL AGENTS

(U)

THE ATTACHED INCLOSURE IS FORWARDED FOR INFORMATION. IT IS A NARRATIVE ACCOUNT OF THE OPERATION OF TASK FORCE WASHINGTON WHICH WAS ASSIGNED THE MISSION OF RESTORING AND MAINTAINING LAW AND ORDER IN WASHINGTON, D.C. DURING THE CIVIL DISORDERS ARISING OUT OF THE ASSASSINATION OF DR. MARTIN LUTHER KING, JR. ON 4 APRIL 1968. SUBJECT REPORT DOES NOT PROMULGATE DEPARTMENT OF THE ARMY DOCTRINE. HOWEVER, THE LESSONS CITED AND IMPLIED MAY BE ADAPTED FOR USE IN DEVELOPING TRAINING MATERIAL AND IN EVALUATING CURRENT OR PROPOSED DOCTRINE.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 065818

AD-880 600L 17/2 5/4

HUDSON INST INC CROTON-ON-HUDSON N Y
SOME ASPECTS OF IMPROVED ADMINISTRATION
THROUGH SPECIAL COMMUNICATIONS AND TELEVISION
SYSTEMS FOR SOUTH VIETNAM, (U)

DESCRIPTIVE NOTE: FINAL REPT. 20 SEP 68-17 FEB 69,
FEB 69 174P CANDELA, BASIL ; NAGORSKI,
ZYGMUNT ; PANERO, ROBERT ; COWLAN, BERT ; NUTHMAN,
CONRAD ;

REPT. NO. HI-1154/4-RR

CONTRACT: DAHC15-69-C-0134, ARPA ORDER-1346

UNCLASSIFIED REPORT

DISTRIBUTION: USGO; OTHERS TO DIRECTOR, ADVANCED
RESEARCH PROJECTS AGENCY, ATTN: TIO.
ARLINGTON, VA. 22209.

DESCRIPTORS: (*COMMUNICATION SYSTEMS, *VIETNAM),
(*GOVERNMENT(FOREIGN), COMMUNICATION SYSTEMS),
(*TELEVISION COMMUNICATION SYSTEMS, VIETNAM);
FEASIBILITY STUDIES, SYSTEMS ENGINEERING,
MANAGEMENT PLANNING, TELEVISION COMMUNICATION
SYSTEMS, FEEDBACK, URBAN AREAS, PROBLEM SOLVING,
RECORDS, DATA PROCESSING SYSTEMS, HOSPITALS,
DIAGNOSIS, RURAL AREAS (U)

IDENTIFIERS: SOUTH VIETNAM, EVALUATION,
VIETNAMIZATION (U)

THE REPORT EVALUATES THE FEASIBILITY OF THREE BASIC
CONCEPTS: EXPANDING ROLE OF TELEVISION AIMED
SPECIFICALLY TO REDUCE PROBLEMS OF RURAL-URBAN
ALIENATION AND DISAFFECTION; ESTABLISHING A RURAL
REFERRAL HOSPITAL SYSTEM TO PROVIDE INFORMATION AND
GUIDANCE TO MEDICAL CORPSMEN IN RURAL AREAS FROM
URBAN CENTRAL DIAGNOSTIC CENTERS VIA AN INTERACTIVE
COMMUNICATION LINKAGE; ESTABLISHING A NATIONAL
IDENTIFICATION AND RECORDS CENTER FOR IMPROVING
GOVERNMENT ADMINISTRATION AND EFFICIENCY THROUGH A
COMMUNICATION NETWORK CONNECTING TO AUTOMATIC DATA
PROCESSING EQUIPMENT. (AUTHOR) (U)

order

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APPENDIX E

Chicago Police Department

TV Camera Evaluation

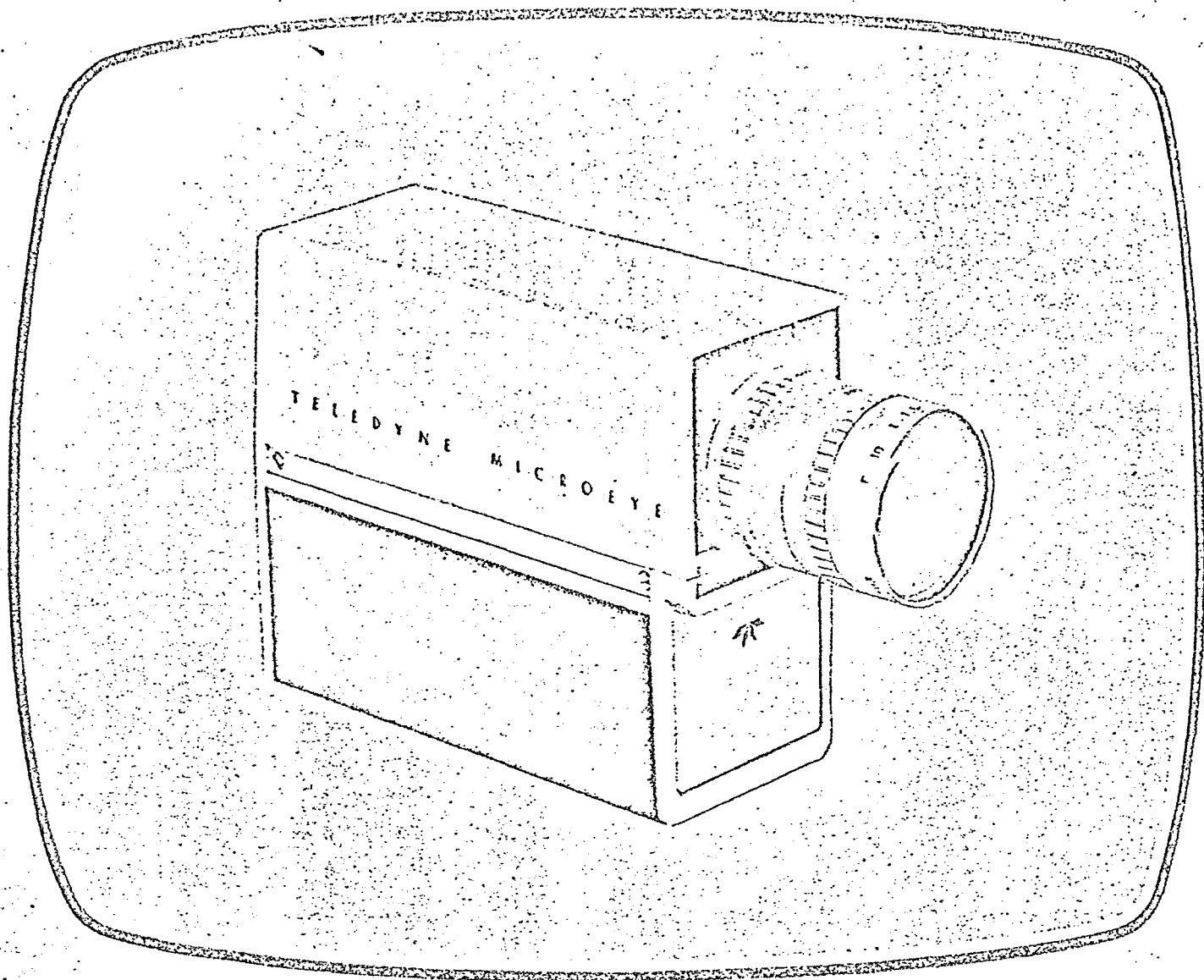
REMOTE SURVEILLANCE

INTRODUCTION

Increasing civil disturbances, rising community crime rates and mass demonstrations have created the need for greater police command and control capability. This, in turn, has created a need for modern technology to provide real time information gathering systems to enable police commanders to make effective decisions. The NASA developed microeye TV camera is an example of such technology.

The process of civil disorders includes several phases of activities that need to be monitored.* The first phase consists of large irritable crowds waiting around for action to begin. It is important to monitor this event to prevent patrolmen from inadvertently triggering a reaction by some small event, and to keep reactions from being triggered by rumors. During the destructive phase it is desirable to control the number of law breakers involved, and the areas into which they move. This requires TV monitoring to give accurate information to the command personnel. Finally, it is desirable to identify the particular law breakers involved in active crimes. One way to do this is to video tape the action and use the tapes for later identification.

Video tape recordings, because of their immediate playback capability, would also allow people to be sorted out rapidly and released, in cases of mass detention. The NASA Microeye Camera is ideal for situations such as these. Its small size will allow easy concealment so that it will not be the target of assault during the monitoring process. Its remote transmission capability would be used to send the TV signal to a relay station which would retransmit it back to headquarters where it could be viewed and/or taped.



M I C R O E Y E

T E L E V I S I O N



TELEDYNE SYSTEMS
CONTROL SYSTEMS DIVISION

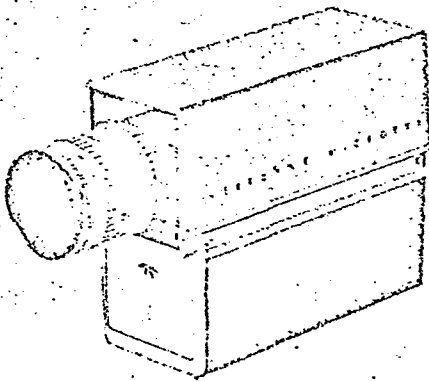
A TELEDYNE COMPANY

M I C R O E Y E

DESCRIPTION

The MICROEYE Television Camera provides the versatility and picture quality of studio television cameras in an ultra-miniature unit made possible by state-of-the-art electronics packaging techniques. The MICROEYE Camera was originally developed by Teledyne for the National Aeronautics and Space Administration, to be used in aerospace applications requiring absolute minimum size and weight. The unique features and simplicity of the MICROEYE make it ideally suited for a multitude of commercial applications as well. The MICROEYE Camera can be packaged in a number of different configurations, depending upon the specific requirements of each application. The standard version of MICROEYE is a complete television camera, self-contained including all necessary video electronics and high-voltage power supply, yet it weighs less than 2.6 lbs., with a volume less than 34 cu. in. The video output signals conform to E. I. A. established composite video and sync format, and the camera oscillator circuits are crystal-controlled to provide the stability necessary for high quality video reproduction. High picture resolution is assured by the use of interlace scan techniques not commonly found in miniature television equipment.

KXO 605 INDUSTRIAL MICROEYE

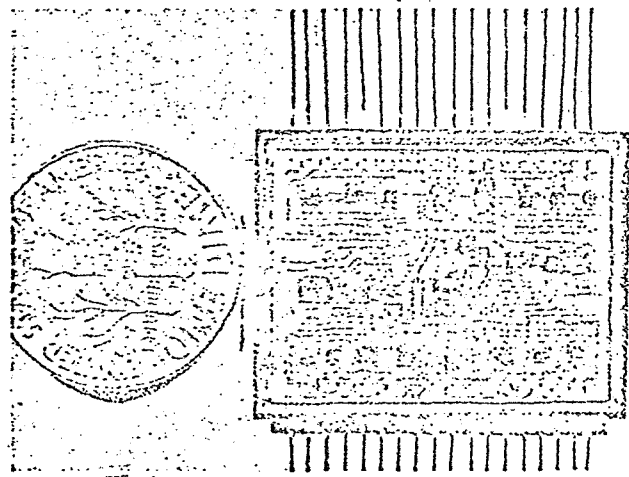


The industrial version of the MICROEYE Camera provides all the characteristics of the standard aerospace camera, but is designed to withstand the rigors of a typical industrial environment. This camera may be combined with any standard television monitor to form a complete closed-circuit television system. It can also be obtained with a self-contained transmitter for remote wireless operation, in which case it is used in conjunction with a mobile relay station or standard television receiver. The industrial MICROEYE Camera illustrated above received an Award of Excellence in the 1967 WESCON Industrial Design Awards Exhibits.

SPECIFICATIONS

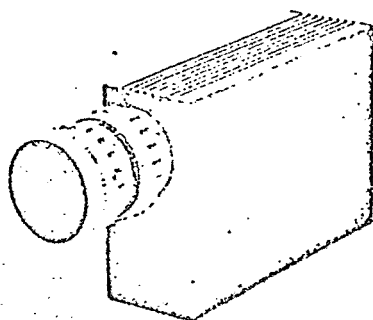
Camera Tube	1/2" Vidicon
Scan	525 Lines Interlaced
Resolution	425 Lines
Field	30 Frames/Second
Bandwidth	6.5 MHz
Sync	Standard E. I. A.
Sensitivity	0.2 Ft. Candles @ Vidicon Face
Aspect Ratio	Standard 4:3
Light Control	Automatic 1000:1
Light Spectrum	Peak 4500 Angstrom with a minimum 85% Response from 4000 to 5000 Angstrom
Video Output	Composite 1.5 Volts Peak to Peak into 75 ohms, compatible with all standard monitors
Lenses	f 1.9 mm Lens Supplied Other 8/16 mm lenses available as specified by Customer
Power Input	28 Volts DC to 400 MA Rechargeable Battery Pack or External Power

MEMA



The Microelectronic Modular Assembly (MEMA) is an ultraminiature electronic packaging technique, developed by Teledyne for advanced military applications which require the ultimate reduction in size and weight. The MEMA Assembly is 1.0 inches long, 0.75 inches wide, and 0.15 inches thick. Within this volume, as many as 80 Micro-electronic circuit chips and miniature discrete components are bonded to an alumina substrate, with all the necessary interconnections to provide a complete multifunction circuit module. The MEMA package is utilized in Teledyne equipment whenever size, weight, and reliability are important packaging considerations, and it is this packaging technique which makes possible the miniature MICROEYE Camera.

KXO 606 AEROSPACE MICROEYE

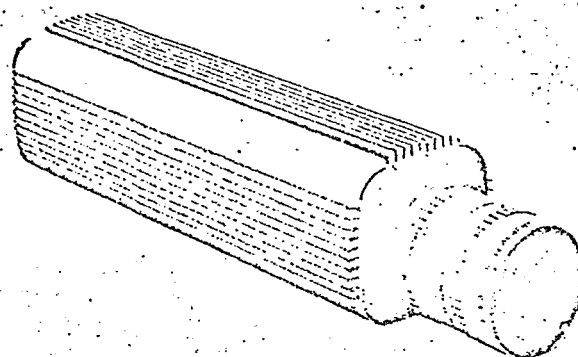


The smallest of the MICROEYE Camera family was originally developed by Teledyne for the National Aeronautics and Space Administration (NASA). Although the video specifications of this unit are E.I.A. standard, and identical to those of other MICROEYE series, the extensive use of MEMA packaging technology makes possible a complete camera (less optional lens systems) in a volume less than 20.25 cubic inches, scarcely larger than a package of king-size cigarettes, with a weight less than 20 ounces. This package design, with a ruggedized vidicon tube, represents the most advanced and reliable aerospace television camera available today. This camera configuration has been designed specifically for aerospace requirements, and has the environmental characteristics listed below:

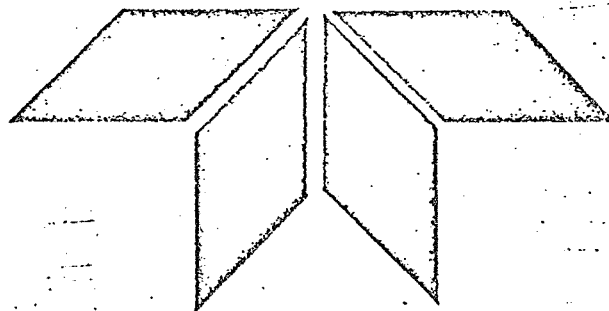
Temperature:	
Non-operating	-10°C to +125°C *
Operating	-10°C to +65°C *
Vibration	0.1 g ² /Hz 50 to 2KHz
Shock	Sawtooth 50 g's peak 10ms
Acoustical noise	140 db 37.5 to 9.6KHz
EMI	MIL-I-6181
Altitude	S. L. to 300K ft.
Humidity	MIL-E-5272
Sand and Dust	MIL-E-5272

* Temperature range can be extended with special vidicon and temperature controlled heater.

KXO 601 FLASHLIGHT MICROEYE



The "flashlight" configuration of the MICROEYE Camera was developed for the U. S. Navy to be used in underwater applications. This camera provides all the features of the standard MICROEYE Camera, but the physical arrangement of components has been arranged in the "flashlight" configuration to provide a unit with minimum cross-sectional area. This unit is approximately 2 in. x 2 in. x 8 in. and weighs 30 ounces. The MICROEYE Camera in the "flashlight" configuration is currently being evaluated for use in a multi-camera closed-circuit television system for use on large commercial aircraft (Jumbo Jets and SST) to aid the crew in ground maneuvering under conditions of poor visibility or restricted area, and may be adapted for in-flight monitoring of control surfaces, landing gear position and condition, etc.



OPTIONS

- ⊙ Pan and Tilt Mechanisms
- ⊙ Shoulder Battery Pack — Two to Twelve Hour Operation
- ⊙ Monitors for Closed Circuit Operation
- ⊙ Fiber Optics
- ⊙ Transmitter for Wireless Operation
- ⊙ Electronic Viewer (1 in. CRT)
- ⊙ Special Optics — Wide Angle, Zoom, Motor-Driven and Other Special Lenses
- ⊙ Pistol Grip

TYPICAL APPLICATIONS

Application of the MICROEYE camera with its various configurations and options is limited only by the user's imagination. Some of the diverse applications presently being considered are:

SPACE/MISSILES

- ④ Spacecraft Cabin Monitor
- ④ EVA Operations
- ④ Launch Vehicle Engine Monitor
- ④ Staging Monitor

UNDERWATER

- ④ Underwater Research
- ④ Underwater Exploration
- ④ Damage Inspection
- ④ Internal Inspection of Pipes/Sewers

AIRCRAFT

- ④ Aircraft Taxi, Takeoff and Landing Aid
- ④ Transport Cabin Monitor
- ④ Helicopter Cable Lift Monitoring
- ④ Flight Test Data Acquisition

INDUSTRIAL

- ④ Remote Instrumentation Monitor
- ④ Process Control
- ④ Security Surveillance
- ④ Monitor for Hazardous/Inaccessible Areas

TV BROADCASTING (PORTABLE ONE MAN COVERAGE)

- ④ Political Conventions
- ④ Sports Events
- ④ Impromptu Interviews
- ④ Remote "On-the-Spot" News Reporting



TELEDYNE SYSTEMS
CONTROL SYSTEMS DIVISION

A TELEDYNE COMPANY

ENCLOSURE A

PRICING INFORMATION

Model KXO 601 Flashlight MICROEYE® and
Model KXO 605 Industrial MICROEYE®

Model KXO 606 MARK I MICROEYE®

Model KXO 617 LLLTV

<u>Quantity</u>	<u>Unit Price</u>
1 - 4 ea.	\$ 4,400
5 - 9 ea.	\$ 4,300
10 - 14 ea.	\$ 4,200
15 - 19 ea.	\$ 4,150
20 - 24 ea.	\$ 4,125
25 - 49 ea.	\$ 4,100

<u>Unit Price</u>
\$ 6,000
\$ 5,900
\$ 5,800
\$ 5,700
\$ 5,600
\$ 5,500

<u>Unit Price</u>
\$ 15,000
\$ 14,400
\$ 14,200
\$ 14,000
\$ 13,900
\$ 13,800

Miniature 1/2 Watt Transmitter

TR 400 VHF Transmitter **

TR 2200 'S' Band Transmitter

1/2 Watt 5 Watt

1/2 Watt 5 Watt

<u>Quantity</u>	<u>Unit Price</u>
1 - 4 ea.	\$ 600
5 - 9 ea.	\$ 570
10 - 24 ea.	\$ 555
25 - 29 ea.	\$ 540

<u>Unit Price</u>
\$ 3,300
\$ 3,135
\$ 3,050
\$ 2,970

<u>Unit Price</u>
\$ 4,200
\$ 3,990
\$ 3,885
\$ 3,780

Battery Pack

Battery Charger

<u>Quantity</u>	<u>Unit Price</u>
- 25 ea.	\$ 200

<u>Unit Price</u>
\$ 100

** Performance characteristics of this
are the same as those described in the
TR 852 data sheet. This unit will be
the same package as the TR 2200 'S'
Band Transmitter.

7 July 1971

TO: Ronald Rae, Acting Director
Research and Development Division

FROM: Patrolman E. Grosskopf, Research and Development Division

SUBJECT: MICROEYE TV CAMERA PRESENTATION AND EVALUATION

The Microeye TV Camera, developed by NASA, was demonstrated on 23 June 1971 in the Crime Laboratory Conference Room. Six members of the Department representing the Training, Intelligence, and Traffic Divisions and the Graphic Arts Section were present. Also in attendance was Deputy Superintendent Madl, Bureau of Technical Services.

Because of its small size and capability of broadcast transmission, the Microeye TV Camera was thought to be of some use to the Department. A list of specifications on the Microeye Camera was given to all attendees (TAB-1).

Certain field tests were set up to evaluate the microeye camera under varied circumstances. (TAB-2). These tests were performed and results noted (TAB-3).

There are police applications that can be accomplished with this type of equipment which can increase the margin of safety for police personnel using it. The major areas for usage are in Graphic Arts, Intelligence and Aerial surveillance. Before any consideration is made to obtain this type of equipment, additional field tests should be made with the manufacturer's most up-to-date equipment. We were given a 1968 model which does not represent the latest innovations in TV Cameras. An increase in transmission range is essential to police operations and would be required. This must be demonstrated via actual field tests by the Research and Development Division before any considerations for purchase (Budget-Federal Grant) should be made.

Patrolman E. Grosskopf #12375
E. Grosskopf

EG:erb

Technology Utilization

ITINERARY.

for

Microeye TV Camera - Presentation and Field Tests

June 23-24, 1971

JUNE 23

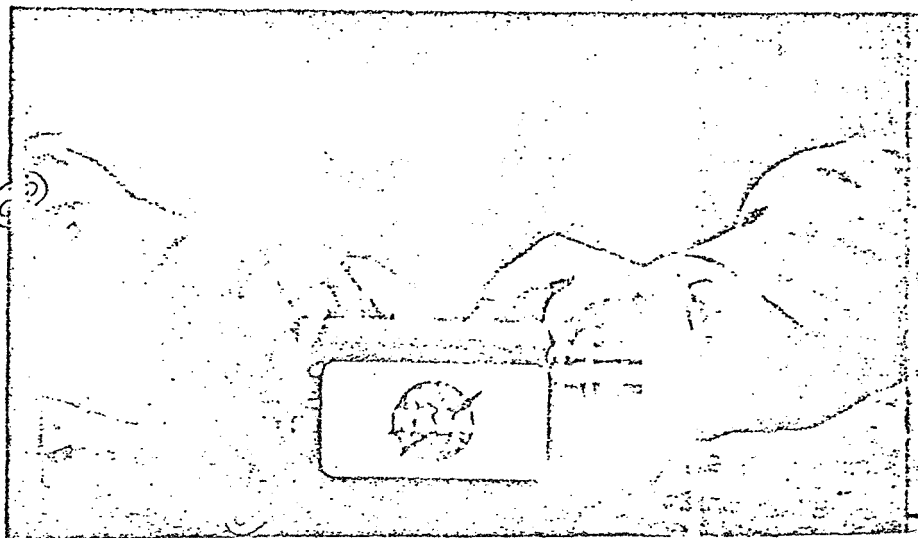
- 10:30 A. M. Presentation - CPD
- Introduction and Film
- 11:30 A. M. Lunch
- 1:00 P. M. CTA Tests (Subway and Elevated)
- Also Video Taping in Loop
- 2:30 P. M. Indoor Monitoring Tests
- Second District Lock-Up Station
- *4:00 P. M. Open Area Monitoring Tests
- Grant Park
-

JUNE 24

- 10:00 A. M. Aerial Testing
- CPD Helicopter
- 11:30 A. M. Lunch
- 1:00 P. M. Traffic Monitoring
- CPD Squad Car

* IF TIME ALLOWS

TAB-2



DESCRIPTION

The MICROEYE Television Camera provides the versatility and picture quality of studio television cameras in an ultra-miniature unit made possible by state-of-the-art electronics and imaging techniques. The MICROEYE Camera was originally developed by Teledyne for the National Aeronautics and Space Administration, to be used in aerospace applications requiring absolute minimum size and weight. The unique features and simplicity of the MICROEYE make it ideally suited for a multitude of commercial applications as well. The MICROEYE Camera can be packaged in a number of different configurations, depending upon the specific requirements of each application. The standard version of MICROEYE is a complete television camera, self-contained including all necessary video electronics and high-voltage power supply, yet it weighs less than 2.6 lbs., with a volume less than 34 cu. in. The video output signals conform to I. A. established composite video and sync format, and the camera oscillator circuits are crystal-controlled to provide the stability necessary for high quality video reproduction. High picture resolution is assured by the use of surface scan techniques not commonly found in miniature television equipment.

SPECIFICATIONS

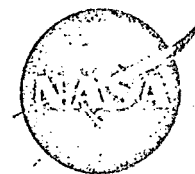
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Scan	525 Lines Interlaced
Resolution	425 Lines
Field	30 Frames/Second
Bandwidth	6.5 MHz
Sync	Standard E. I. A.
Sensitivity	0.2 Ft. Candles @ Vidicon Face
Aspect Ratio	Standard 4:3
Light Control	Automatic 1000:1
Light Spectrum	Peak 4500 Angstrom with a minimum 85% Response from 4000 to 5000 Angstrom
Video Output	Composite 1.5 Volts Peak to Peak into 75 ohms, compatible with all standard monitors
Lenses	f1.9 mm Lens Supplied Other 8/16 mm lenses available as specified by Customer
Power Input	28 Volts DC to 500 MA Rechargeable Battery Pack or External Power

OPTIONS

- Pan and Tilt Mechanisms
- Shoulder Battery Pack — Two to Twelve Hour Operation
- Monitors for Closed Circuit Operation
- Fiber Optics
- Transmitter for Wireless Operation
- Electronic Viewer (1 in. CRT)
- Special Optics — Wide Angle, Zoom, Motor-Driven and Other Special Lenses
- Pistol Grip

P. T.	AREA VIEWED	RESULTS	COMMENTS
T	Subway Station	Poor	Stations require more lighting to obtain good pictures
	Elevated Cars	Fair	Also would require increase in lighting
	Elevated Station	Good	Good picture of cashier area and platform
Door Monitoring	2nd District Lockup	Good	Same results could be gotten with regular TV cameras but with Micro-eye they could be less conspicuous
Open Area Monitoring	Grant Park	Poor	Could not transmit more than 50 feet plus cameras automatic iris did not work properly
erial	Dan Ryan Expressway	Fair	Problem was in the portable monitor -
	Eisenhower Expressway	to	unable to view what
	Sportsman Park	Good	picture was being recorded. Camera was easy to handle in helicopter
Traffic Monitoring	Outer Drive	Good	Video tapping of traffic violators was good. Camera did not obstruct view when placed on dashboard

NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U.S. space program, to encourage their commercial application. Copies are available to the public at 15 cents each from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Ultraminiature Television Camera

An ultraminiature television camera with a total volume of 20.25 cubic inches has been developed. The design utilizes microelectronic modular assembly packaging techniques and contains a magnetically deflected and electrostatically focused vidicon, automatic gain control circuit, power supply, and transmitter. The camera requires 28 vdc power, operates on UHF, and accommodates standard 8-mm optics. Maximum resolution has been obtained by using interlace scan techniques.

The camera to this point has displayed resolution and performance favorable to the successful development of an ultraminiature television system. The camera has demonstrated its ability of transmitting a picture with resolution in excess of 400 lines and to maintain the size requirements demanded of an ultraminiature instrument.

The ultraminiature television camera that has been designed conforms to conventional television practice

and is compatible with standard commercially available television monitors.

Complete details of this development are contained in *Ultraminiature Television Camera*, by R. J. Deterville and N. Drago, Teledyne Systems Company, Final Report, July 1966. Copies of this report are available from:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B67-10469

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: R. J. Deterville and N. Drago
of Teledyne Systems Company
under contract to
Marshall Space Flight Center
(MFS-11967)

Category 01

6 May 1971

In reply refer to: L71M-202

ITT Research Institute
10 West 35th Street
Chicago, Illinois

Attention: Mr. Petraccaro

Subject: MICROEYE[®] Television Camera System

Reference: Telecon Mr. Petraccaro/Mr. R. Smith
Dated 28 April 1971

Gentlemen:

Pursuant to the reference telecon, Teledyne Systems Company, Control Systems Division wishes to confirm the following firm, fixed prices for a MICROEYE[®] Television System:

- | | |
|--|----------|
| 1) KXO 601 or KXO 605 MICROEYE [®] Camera | \$4,400. |
| 2) KXO 606 MICROEYE [®] Camera | \$6,500. |
| 3) Battery Pack | \$ 200. |
| 4) 150 Milliwatt Transmitter capable of
transmitting 200 feet straight line | \$2,000. |

We trust this information meets with your approval. Teledyne will look forward to participating further with ITT Research in your future endeavors. Should you desire any additional information or assistance, please feel free to contact Mr. R. Smith, of our Engineering Department, or Mr. R. Young, cognizant Contract Administrator.

Very truly yours,

TELEDYNE SYSTEMS COMPANY
CONTROL SYSTEMS DIVISION

D. H. Tessier
Manager of Contracts

DHT/mb

APPENDIX F

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